Bulletin of The Medical Library Association

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MEDICAL LIBRARY ASSOCIATION MEETING

Members of the Medical Library Association are most cordially invited to attend the next Annual Meeting which will be held in Chicago June 19th to 21st.

Those of us who have been fortunate in attending past meetings have enjoyed attractive programs, inspiring addresses, agreeable professional and personal contacts, social intercourse and hospitality. In proportion as we feel pride in the achievements of our organization, we likewise feel responsibility. Only with the entire confidence, the united support and loyalty of our profession can this association contribute its beneficent share towards elevating the standards of medical education.

These meetings function as a clearing house for the exchange of professional ideas, experiences and counsel. Stimulating and instructive discussions generate new plans for improvements. The inspiring achievements of colleagues encourage emulation. Good fellowship and friendly intercourse foster that unanimity of purpose and concert of action essential to the dignity, progress and usefulness of our profession. Thus, enjoyment and profit merge and become identical.

Come one, Come all! Each will contribute a valuable share to the success of the meeting.

The Drake Hotel has been chosen as headquarters. Rooms will be available at reasonable rates: $3.00 to $3.50 and up for singles, $4.00 and up for doubles, with bath.

As the New Year is bringing many conventions to our mid-western metropolis, it is urged that members make their reservations early. The

Century of Progress will bring thousands to our city and may place hotel rooms at a premium. So we once more reiterate: Make your reservations early! Be sure to mention that you are attending the Meetings of the Medical Library Association, and address your requests to

Mr. Russel W. Schneider, Convention Manager,
The Drake Hotel,
Lake Shore Drive and Upper Michigan Ave.,
Chicago, Illinois.

It will be our pleasure to bid you Welcome next June.

Program and Entertainment Committee
per Judith Wallen Hunt.

ALCHEMY AND THE ALCHEMISTS*

By GARRETT E. WINTER

Whenever the word alchemy is brought to our attention I daresay that most of us conjure up all the mysteries of childhood as embodied in the Arabian Night's tales, all the queer and unexplainable stories we have heard, and link them up with alchemy and other mysteries of the dark ages. And indeed alchemy is in itself a mystery, some of which I shall attempt to unravel for you this evening

If we study the history of a modern science such as Roentgenology or Business Statistics there is little to provoke discussion as to its origin. Their history is clearly recorded within a century. But astronomy, alchemy, and indeed, medicine itself, trace their past far back into the dark ages and the early dawn of human knowledge. Thus they resemble the earliest nations, not only in possessing a history as old as civilization, but also tracing their origin to giants, superhuman men, and demigods. Thus we see alchemy arises from fable and dogma rather than from clear cut patterns of knowledge.

As to the derivation of the word Alchemy, many writers believe that the term arose in Egypt. Scalinger and Borrichus claim to have seen a work in the French King's library written in Greek by Zoziums, the Panapolite in the fifth century, in which he claimed to have concluded from the scriptures that there existed a tribe of genii who had the unhappy faculty of falling easily in love with women. The angels captivated by the women taught these genii all the operations of nature. As a result the women remained out of heaven because they taught mankind all manner of evil. From these genii and women, giants sprang. The knowledge and tradition of this art taught to the genii was called "chemia," hence the art was known as "chemia". Plutarch asserted that Egypt was often called Chemia. Some Arabian and early European alchemists believed a Hermes Trismegistus who was supposed to have been Chanan, son of Ham whose son Mizraim first occupied Egypt, was the father of the science. He is supposed to have flourished two thousand years before Christ. Many Arabian polypharmists believed Sarah took a table of emerald from the hands of Hermes after he was entombed. Upon this table were engraved the dogmas of Hermes concerning his chemical secrets. While his existence is believed to be mythical, the existence of such a tradition among both eastern and western peoples makes one believe the etymology of the word is connected with Egypt.

Many critics later than the medieval ones believed the word sprang from a Greek root which meant juice or menstruum in referring to the acids, lyes, and other solvents used by the alchemists and chemists. This caused the word to be spelled "alc-h-y-m-y." Boerhaave believed the word to be drawn from a Greek word meaning to fuse or melt. Suidas, producer

*Delivered before the Victor C. Vaughan Society of the University of Michigan Medical School December 17, 1931.

of a lexicon in the eleventh century, explained chemia as meaning the conversion of silver and gold from inferior metals. Suidas also suggested that the invaluable fleece which Jason and his argonauts carried away from Colchis was a treatise on goldmaking written on hides. Since however, before the time of Suidas the Greeks had neither the name or the thing in relation to alchemy, his assumption is merely fiction.

There can, however, be no dispute about the prefix "al." Clearly Arabian in origin, the chemia was used to denominate the difference between the common chemial operations and the masterful stroke—the transmutation of baser metals into silver and gold. It was to them the chemistry of chemistrys. We have then the word Alchemy derived in part from the Ancient Arabs and in part from either the Greeks or Egyptians as you may choose.

If the Hebrew Scriptures be interpreted correctly Moses must have had a fund of chemical knowledge relating to metals. He is reported to have burned Aaron's golden calf and to have strewn the ashes on the water. To produce such effects required some knowledge, at least, of the action of sulphur salts. However, Aaron's calf may have been largely brass and some gold, which combination would have rendered its calcination easy. Also, a practical acquaintance with such reactions does not necessarily imply a knowledge of scientific principles or processes. Brewing and baking were long used before the complex chemical principles back of them were understood.

Dumas on the other hand, believes an obscure parentage dominated the existence of chemistry and alchemy. Practical chemistry, he stated "took its rise in the workshops of the smith, the potter, or glassblower; and in the shop of the perfumer; and let us just agree that the first elements of scientific chemistry date no farther back than just yesterday." Browne however, felt that practical chemistry could not have existed without a previous or at least, coincident theoretical chemistry, and rather than stop at the workshop of the civilized or semi-civilized life he would carry it to the primeval family. "If," he says, "practical chemistry consists in the performance of operations essentially chemical in their nature, then the first man who kindled a fire or roasted an ox was the father of all such as deal in that manifold art."

If Dumas is correct and chemistry, as such, dates with the Lavoisierian developments, it is a contemporary of the printing press and other modern developments. Sir Thomas Browne felt that immortal though Lavoisier's work was, there were epochal discoveries before his work. Each of these movements or discoveries had some truth to bring forth and some error to leave behind it. In other words, alchemy should enjoy the distinction of being the predecessor of chemistry and having a genuine scientific function to perform. If, then, we wish to trace the history of chemistry we must also trace the history, development, and relation of alchemy to science in general and chemistry in particular.

I desire to follow Browne in his chapters on Alchemy and the Alchemists. Therefore, with him I should like to glance at the ideas of classical

Greece respecting nature to obtain a background for the later study of Alchemy.

Thales, of Miletus, a Greek philosopher, was the first to postulate water as the first principle of things. He believed water could be, and was, converted into some thousand and one creatures and inanimate things by some plastic process. Such ideas, although they are fantastical to us did not seem so then. Rocks and salts were extracted by boiling and evaporation of sea, lake, or rain-water. Lavoisier was first to demonstrate water could not be converted into earthy matter if proper distillation were carried out. Scheele did the same. In addition the marvelous effects of moisture upon growing things and the indispensible need of water by the living animal served to strengthen the belief that water was the one and all in the material world.

Anaximenes, one of Thale's successors in Greek philosophy, modified this doctrine so as to count air as most important. If we use the same reasoning here as we have applied to the theories of Thales on water we can understand how air should be assigned such importance. Browne in 1851 stated that Davy and Prout believed in the conjecture that oxygen and hydrogen, the coefficients of water, were the original elements of the whole world.

Pythagoras is given credit for promulgating the doctrine of the "four elements" or the Quaternion. Probably, then, it was stolen from Egypt—lending credence to Alchemic claims that their mysteries descended from the Nile. However, Empedocles probably not only gave the dogma a footing in the world, but also made it a consistent hypothesis. Briefly the doctrine of the "four elements" was as follows: An armful of wood or other combustible material is burned on the surface of a cold body; smoke, or "air," is liberated and rises; flame, or "fire," follows the smoke; moisture, or "water," settles on and around the rock; and ash, or "earth," remains. The wood has been broken down into its four elements: air, fire, water, and earth. This reflection of Empedocles Browne believes was the "first scientific reflection upon a chemical transformation." This marks the long sought origin of chemical science, he continues, since science he defines as "the methodical scientific reflection on the observed phenomena of any one department of nature." Science need not be all truth and contain no error, or else all of our past sciences and many of our present sciences are unworthy of that name.

The Greek mind generalized after Empedocles' doctrine was sounded. Concrete claims were not made, but these four elements were the components of the whole of nature. Demetrius fell back to the Thalesian idea, as did Plato to a certain extent. He maintained fire, air, and water were transmutable one with the other, but earth remained alone. Only two permanent elements existed he held—the common principle of fire, air, and water being the one, and earth the other. Aristotle discarded his master's tenets of number and his ideas of matter, and believed with Demetrius and Thales in one radical element of the universe. Greece not only furnished other peoples with the paths to knowledge but also a result of classical Greek

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culture was the inductive method of study invented by Aristotle—then forgotten for many centuries and recasted by Roger Bacon.

The doctrine of the four elements as given above has been praised, overthrown, attacked, and, in turn, proscribed by modern science, only to have been revised by modern science in the middle of the nineteenth century. Modern analysis goes farther—four elements there are—but fire is composed of heat and light; smoke contains carbon, oxygen, and hydrogen; water is oxygen and hydrogen; and earth has also been subdivided. The relationship of these three forms of matter is now understood and casts light on Plato's and Aristotle's theories of the transmutability and mutual convertibility of these elements.

We mentioned a while back that Aristotle invented the inductive method used so much by science. It degenerated when received into the hands of his followers until Bacon came along, because they were unable to use it. They set him up as an infallible authority—monarch and idol of their thoughts. He reigned long against the protests of the alchemists. However, it was not Aristotle that reigned during the days of early alchemy in Europe but his ideas distorted and perverted by his followers. They did not study his principles, they only adopted them.

In summarizing the Greek classical period and the influence it exerted on alchemy of the middle ages in Europe, it must be understood that the dogma of the four elements and their mutual convertibility and the idea of a fifth element common to the four, predominated in the thought of the day. In those theories lies the one root of Alchemy, based on the observation of nature as expounded by the master philosophers of Greece and followed by the mediocre minds of the early Christian era and the Dark Ages in Europe.

For the other root underlying Alchemy as a science we must go to the school of the polypharmists which flourished in Arabia during the Caliphates of the Abassides. Geber has written the earliest work known in Europe about this movement. It is his "Summa Perfectionis" or Summit of Perfection. It was written in the eighth century and is a summary of all that was then known and believed, for no one knows how far back in the history of the world. These Arabian polypharmists had been boiling, dissolving, precipitating, subliming and coagulating chemical substances for a long time. They worked with gold, mercury, arsenic, sulphur, salts and acids. They looked on chemistry not as a theory of all nature, but as a laboratory of curious and rare substances. Geber from his work on these Arabian polypharmists taught that there were three elemental chemicals—mercury, sulphur, and arsenic. Gold, signified as the most perfect of metals, was dissolved by quicksilver. Brimstone pierced iron if the metals were white hot, forming a new substance which had properties found neither in iron or sulphur.

Besides the chemical theory expounded above these Arabians had their Alchemical theory. They believed metals to be the compounded bodies, extracted from calxes, rusts, or earthly ores by heating; and although these

calaxes did not resemble metals, it was easy to change them into metals—iron rust into iron, lead calx to lead, and so forth. Thanks to Lavoisier and his school we know that carbon carries oxygen away from the ores and that the ore was composed of the metal plus oxygen. To the Arabian alchemists, however, it looked as if the ores received something from the fire or furnace to become metals. It took Lavoisier many days to prove that the reverse took place.

In addition to the teaching that there were only three elementary metals and that metals were compounded, the Arabs taught that all metals were composed of mercury and sulphur in varying proportions. Davy at one time believed that the metallic and other elements were compounds of hydrogen with an unknown base in varying proportions. Browne says that both Davy and the Arabian Polypharmists are in error. Mercury and silver are as much and as little elemental bodies as are silver, gold, lead, tin, copper, and iron. The hydrogen he found to be only the hydrogen contained in the pores of the metals. Thus the oldest and youngest schools of chemistry until the nineteenth century were similar in that they toiled at making medicines of the mixtures and chemicals at their disposal; they believed in the transmutation of metals into one perfect and all-powerful metal but did not attempt or effect it. They were, Browne continues, a race of hardworking, scientific artisans with their pestles and mortars, crucibles, furnaces, vessels, infusions, decotations, fixation, sublimation, and coagulation. They invented many useful chemical processes and did much good. Their scientific religion was transmutations. Where did these Arabians obtain their scientific faith? Perhaps they received it from their ancestors as traditions, perhaps the Fatimites of Northern Africa gave them their ideas. It is possible that these Africans founded the doctrine of four elements and mutual convertibility and passed it on. Mayhap Greece furnished the Arabs with the ideas, the Arabs in turn modifying the theories to their own forms of matter. It is impossible to settle the origin definitely from the historical works available. However, if these dogmas are the direct result of Arabian thought, or if they are a mixture of Greek ideas and Arabian facts, we shall now trace their influence upon European Alchemy.

Carried into Europe by the Moors of Africa and by the returning Crusaders from the far Eastern climes, the Arabian ideas and ideals of chemistry obtained a foothold in Europe and became interwoven intimately with the fantasies and subtleties of European philosophy. In Spain we see it obtaining its first nurturing under the patronage of Ommiades during the tenth century. From the eleventh to sixteenth centuries inclusive it branched out as an octopus to England, Germany, France, and Italy in succession. To trace the development of alchemy in Europe, the clearest and best result is obtained by tracing the contributions and theories advanced by the outstanding alchemists in each country in the order in which alchemy obtained a foundation in European nations.

In England the eleventh century produced one outstanding philosopher,

chemist, physicist, and scholar. Roger Bacon, born in Somerset county in 1214, is that man. He studied at Oxford and Paris and became a Franciscan friar. Although little is known of his social life, historians tell us he was slandered, dreaded, and suspected, by his countrymen. He was accused of fabricating a brazen head which uttered oracles to Bacon when consulted by him with magical incantations; he was frequently imprisoned; finally he was poisoned by jealous and fanatical brother-monks. He had a splendid intellect and saw beyond his age. In one volume, "The Wonderful Power of Art," he condemned magic, necromancy, the doctrine of charms, etc. By virtue of his knowledge of Latin, Greek, Hebrew, and Arabic he delved into the entire physical knowledge of the day. He believed observation took an equal rank with reason in scientific work in natural phenomena. Bacon knew the chemistry of gunpowder and gave directions for its preparation. He claimed the thunder, lightning and magic witnessed at Oxydrakes by the Macedonians during the siege of Alexander were due to fulminations of that mixture. Since the Moors introduced gunpowder into Spain in 1342, Bacon's knowledge evidently came from his Oriental studies. Although he believed inferior metals could be converted into gold, like his Eastern predecessors, he does not claim to have accomplished this. He had a deep faith in the existence of an "elixir of life" as did Geber, he believed potable gold (dissolved in Hcl or aqua regia) as the one elixir. On one occasion he wrote to Pope Nicholas IV of an old Sicilian who came upon a golden vial of yellow liquor while ploughing one day. Believing it to be dew, he drank it, and was at once transformed into a hale, robust, and hearty youth. Abandoning the field and plow, he entered the service of the King of Sicily and served the court some eighty years. Bacon is reported to have taken solutions of gold salts himself, although he died at the age of seventy in 1284. But why be amused at such fancies. We smile at the treatments our grandparents and even our uncles have used; it is indeed very likely that some of our fads in medical treatment may cause riotious laughter among our successors. There is likely as much nonsense believed and truth rejected in our time as there have been at any other period. Past centuries have revealed much real progress, no small amount of which is due to Bacon and his contemporaries, for their task was more difficult than that presented to the eighteenth and nineteenth century chemists.

Germany next received the teachings of Alchemy. Albrecht Groot, or Albertus Magnus is the name associated with Teutonic alchemy. Born in Suabia in 1193, some twenty years before Bacon, he died two years earlier than the renowned Englishman. He was reputed to have been stupid in early life, studied medicine at Padua and taught it at Cologne and Paris, travelled all over Germany as a Dominican friar, sojourned at Rome for some time, and later was appointed Bishop of Ratisbon. In fact he was a theologian, physician, astronomer, magician, necromancer, and quite a man of the world, to say nothing of his polypharmacy. He wrote on the latter subject and related fields. He described the chemical water-bath; the alembic and aludel; was acquainted with caustic alkali; could purify royal metals with lead; and purge gold by cementation. He experimented with red lead,

arsenic, and sulphur. His style is plain and understandable. He believed with Geber on the sulphur and mercury theory but attributed to water the place nearest the source of things, as did Thales of ancient Greece. He was a workman rather than a visionary and a scholar, however.

Thomas Aquinas, a pupil of Albert Magnus and also a Dominican, wrote several treatises on Alchemy. He first used the word "amalgam" referring to the quicksilver in penetrating tin, lead, and silver and making a homogeneous paste of them.

Raymond Lully, accorded the distinction of being Bacon's first pupil, was born in Majorca, France, in 1235. He entered the army and court, studied medicine at Paris and founded a cloister of Minorites in Minorea. He travelled continually over Europe and Asia as an impassioned missionary to the heathen, yet dabbled in chemical work. He was the first to use symbols and wrote some sixteen works very inferior to those of Bacon and Magnus. His observations were good but were couched in unintelligible jargon. He made observations on distillation of cream of tartar, deliquescence of alkalies, preparation of aqua regia, alum, white and red mercurial precipitates and many other things. He pronounced the spirit of wine as the elixir of life. He was therefore, Browne says, "a restless, intelligent, inventive, and somewhat fanatical busybody in the affairs of church, science and life; and an ardent and generous spirit withal, and not without a great degree of utility in his generation."

Arnoldus de Villa Nova was a heretic rather than the churchmen his predecessors were. The Pope protected him from death, however. Born in Provence in 1240 he was educated at Barcelona under Casamilla. He fled to Paris because he forecasted the death of Peter of Arragon. As a teacher at Montpelier, his advice was sought by kings and popes. His best of twenty-one works is the Rosarium, a compend of alchemy. In theory he was plain but in practice he was weak. He believed mercury to be an element in all metals, and gold and gold-water the most precious of medicines. He did a great deal of experimental work.

Two Hollanders next are important in European alchemy. Isaacus Hollandus and his son, belonging to the thirteenth century, held Albertus Magnus in reverence. Their treatises were clear and precise, and they were the first to draw the apparatus they employed. While they were plain speaking and clear, having written in Latin and German (the first European scientists who wrote in a vernacular) they did nothing to advance the practical phases of alchemy or chemistry.

In Basil Valentine was combined the vigorous impulses and the poetical character of Bacon, Magnus, and Lully, with the common sense of the Hollanders. Born in Saxony in 1394, he became a Benedictine monk and a celebrated alchemist. He introduced antimony into medicine—perhaps assigning the name "antimonk metal" after experiments on his fellows. He wrote the "Triumphal Chariot of Antimony," a clear, lucid account of the metal so long as he confined himself to the chemistry of the metal. When

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he attempted chemico-medicinal speculation about it he wandered far and wide. He knew many substantial chemical facts about zinc, bismuth, manganese, nitrate of mercury, corrosive sublimate, white lead, etc. Browne refers to him as the founder of analytical chemistry.

Looking back we see Bacon as an example of enormous industry and an exalter of the experimental method; Albertus Magnus as having wide accomplishments and elegant style in writing; Arnold as having applied the art of distillation to chemistry and research; Lully as having called attention to the products of distillation; and Valentine as the founder of metallurgy and analysis; now we come upon the alchemist of alchemists, Paracelsus. In him we have the determination of a Bacon, the inventiveness of an Arnold, and a Magnus, as indomitable as a Lully and as enthusiastic as a Valentine; yet the quality of truthfulness of character was wanting in Paracelsus and he fell.

He was born near Zurich early in the sixteenth century, as Theophrastus Bombastes. Bombastic he was as revealed by his arrogance, vanity, insolence, and strutting in later life. In his adolescence he was a purist, drinking nothing but water and eating little but bread. He continued this until appointed professor of chemistry at Bale in 1527, the earliest chair of chemistry to be established. As a physician he was extremely successful and presumptuous; as a professor he was eloquent, learned, and insolent, also to an extreme. He burned authoritative books before his students; made no attempt to withhold his contempt of Arabian shop-doctors and early learned men; praised Hipprocrates to heaven, and himself nearly as much; and created a storm in Bale that called for his professorship in the chair of chemistry, Paracelsus himself being forced to flee. After many ups and downs, this man of extremes died in an obscure tavern in Salzburg—as a result of a period of debauchery and brawling. In spite of his miserable end and his pompuousness, one cannot deny his reform and importance in chemistry and medicine. He broke down the hollow scholastacism of his era, he looked on pharmaceutical chemists as hopeless plodders, he perceived the value of the neglected teachings and rules of Hippocrates. Had he done these three things well he would have become the father of modern science, but his appetite governed noble mind. His ambition, vanity, love of opposition and destruction, his eagerness for power and reputation, and his great desire to conquest nature's secrets of life's elixir caused his downfall. In the latter he failed and was too proud to admit it, therefore he talked and wrote "an infinite deal of nothing" and the student is wont to feel he was a mere talker. However, he was a vigorous thinker and brought mere alchemy to an end. As did Valentine, he believed in mixtures or compound bodies, salt, sulphur, and mercury. Everything was one of these. One element was common to all of these—a fifth element—the quintessence of creation, of which the four elements were only derivatives of embodiments. It was he who first began to think of chemical considerations in the physiology and pathology of the human body in health and disease. Likewise, he introduced the word "alcahest" into alchemy; this word being usually applied to the universal solvent, and said to mean "it is an alkali." While he perhaps did not seek

this solvent it may be said to represent his idea that the one prime element of things was a true alcaest—a fifth element of things to be at once the philosophers stone, the universal medicine, and the irresistible solvent. In order to find this triple band of existence and wear it as a crown, he realized he must live pure and clean, yet he tarried in his mission, sank into disgrace and poverty, and died in a squalid tavern and public brothel. Yet Browning in his poem "Paracelsus" gives us the reasons for remembering his name and stormy, but beneficial, career.

After the death of Paracelsus, European alchemy split into two groups. One composed a number of weaker men who followed the older school whom Paracelsus ridiculed. The other class devoted themselves to the discovery of new compounds and reactions with diligence and infinite labor. The one group attempted to find a host of foolish representatives, became mysterious and mostly humbug. The other group contented itself with the aims of the commoner and more practical chemistry, and became chemists in fact and deed. It is unnecessary to trace the alchemists after this decomposition of the old alchemical character. They are neither historical nor do they belong with their age—they are behind it. The misnamed alchemists after Paracelsus are mere inanities after that period. They could not do one useful thing. They could only compile mystical tracts into books as a result of their weakness, and father such volumes on Aristotle, Magnus, Paracelsus and other great alchemists who never wrote any such nonsense. They formed themselves into secret associations, Rosicrucian fraternities, and what not. They were those whom Singer refers to as "bands of dupes and chalatans who since the Middle Ages had been seeking the philosopher's stone." Browne says "it is this wretched remnant of a great school that gave the historians of the eighteenth century their impression of alchemy." The group had opportunity to play havoc and many a strange imposture was practised in the name of Aristotle, Geber, or Raymond Lully. From this epoch came those stories of deceit, knavery, and fraud which have characterized alchemy as we have been taught to regard it—strangers selling huge ingots of gold to jewelers, the latter finding out that only tin and lead had been used in the manufacture of the prize. They made up large nails half of iron and half of gold, joined them together, lacquered them to look like iron, and sold them to dupes with greedy hands who had seen gold ingots extracted from plain iron. Most of the accessible tracts and treatises compiled at that time were the only ones available in the nineteenth century. They contained wilder passages of the old masters without any of their real knowledge and practical remarks, mangled, inflated, and repeated time and again. Written by quacks, charlatans and knaves, and ascribed to the masters we have studied to-night, it is not to be wondered at that the term "alchemy" has long been synonomous with quackery. It has been my aim to show that such association is unfair and unjust and that the real alchemy should have an exalted place in history as the predecessor of the real and scientific practical chemistry.

In summary then, we may say that the alchemists, aside from being

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diligent experimentalists and practical chemists, cherished three beliefs which I shall briefly state.

Firstly: They believed in the universal solvent. Browne, in 1850, seemed to think that flourine, then newly discovered, was this substance. We know now that flourine has no action on a platinum vessel, among other things.

Secondly: They believed in the transmutability of metals. If any one element could satisfactorily be converted into any other, this second problem of the alchemists would be solved.

Thirdly: The European alchemists also believed in the elixir of life, or universal medicine, capable of curing all ills and diseases, and prolonging life far beyond the then limited life span.

These ideals of the alchemist show how he attempted to bring lofty but imperfect theories of nature into accord with the world of facts. Their ideals were sublime, their accomplishments towards their goal were few; they failed and have passed away. However, from their struggles and triumphs we learn the same feverish, uncalculating, unsatisfying and weary discipline throughout all the ages. Without them true science could not progress. Perhaps through a knowledge of wherein they failed we can obtain some degree of aid in overcoming the difficulties that confront us.

COMMITTEE ON THE COST OF CURRENT MEDICAL PERIODICALS

The Committee on the Cost of Current Medical Periodicals, consisting of Colonel Fielding H. Garrison, Mr. Alfred Robert, and Mrs. Eileen R. Cunningham, Chairman, met in Baltimore on Saturday, November 26, 1932. At this meeting, it was decided to cooperate with the committee of which Mr. Charles H. Brown, of Iowa State College, is Chairman, appointed by the American Library Association.

Miss M. Myrtle Tye, Chairman of the Executive Committee of the Medical Library Association, and Mrs. Eileen R. Cunningham, Chairman of the Committee on the Cost of Current Medical Periodicals, attended a meeting of Mr. Brown's Committee in Chicago during the week of December 26. At this meeting certain proposals from Mr. Springer were discussed, as well as various other phases of the situation.

The American College of Physicians, realizing the seriousness of the situation, decided to join with the Medical Library Association in an appeal to the scientific group of Germany. This was issued as a letter, which is published in this number of the Bulletin.

The Committee is continuing to study the situation from every angle, and an attempt has been made to interest all scientific workers, both in this country and in Europe, in the seriousness of this unfortunate situation.

Every librarian should draw the attention of the members of library committees and faculties to existing conditions, referring to statistics contained in the article by Mr. Robert published in the Bulletin of the Medical Library Association, N. S. v.20 No. 4, April, 1932, pp. 140-155, especially percentage of cost, top of p. 150.

IMPORTANT LETTER SENT TO GERMAN SCIENTIFIC SOCIETIES AND EDITORS ASKING THEIR COOPERATION IN BRINGING ABOUT A REDUCTION IN THE COST OF CURRENT GERMAN PERIODICALS

During the past eight years, workers in the biological and medical sciences have viewed with concern and dismay the constantly increasing cost of German scientific periodicals.

It was at first hoped that this was merely a temporary result of the high prices necessary during the period of readjustment following the war, and the unstabilized value of the Reichsmark. But the rehabilitation of the Reichsmark had no effect upon the cost of the periodicals, which continued to increase, and subscribers found themselves paying exorbitant amounts for those journals. Libraries have been attempting to maintain these subscriptions at rates which are now generally recognized to be prohibitive. (See pages 11-12 of inclosed reprint).

It is true that there has been an increase in the cost of publication and printing; as far as can be ascertained, this increase is probably 100% higher than in 1913, yet in many instances subscription prices of certain journals are from 400 to 500% higher. (Ref. Prof. Georg Leyh, "Zent. f. Bibliothekswesen," Heft 8, Jahrg. 49, 1932).

These journals have been put into the prohibitive luxury class for many workers and many institutions. The German journals are used by a smaller group of readers, due to the language difference; and therefore, a library which is paying five to eight times more for German periodicals than for those of any other country, would probably be forced to economize first on these most expensive periodicals. The majority of libraries are facing substantial cuts in their appropriations, and the indications are that there will be further cuts in the near future. It therefore seems certain that unless something is done to decrease the cost of these journals, cancellations of subscriptions are inevitable. Every scientific worker agrees that such a contingency would be very regrettable, and therefore we are appealing to you as workers in the same field, as individuals having the same interests and objectives, to consider with us this problem which is at present a very real hardship to the research worker, and a stumbling block to the furtherance of progress in science and medicine as a whole.

There are many difficulties to be surmounted, but the following suggestions might assist in ameliorating present conditions:

1. An attempt should be made by German scientists and publishers to decrease the size and number of volumes through briefer articles and careful editorial selection. This should be possible without loss of important scientific data.
2. The journals should have fixed annual subscription prices, and the approximate number of volumes appearing each year should be determined in advance.

Surely this problem can be approached from a cooperative viewpoint. The placing of the important scientific literature of Germany beyond the economic reach of the majority of subscribers, has caused difficulties and hardship to scientific workers throughout the world. Is this situation to continue until, due to world economic conditions, widespread cancellation of subscriptions has become inevitable? Will you not cooperate with other interested scientists and use your influence to assist in overcoming these difficulties?

WALTER R. STEINER
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SOME ASPECTS OF THE RENAISSANCE

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To attempt to cover the period in history known as the Renaissance in a short paper of this type is, at the outset, impossible, for in order to comprehend it in the most meager fashion, one not only must be familiar with the details of the history of that particular age, but also must have followed the development of man's civilization from ancient times through the Medieval period. The influence of Greek and Roman culture upon the Renaissance is inestimable. The so-called "darkness" of the Medieval age had, in itself, an incalculable effect upon what was soon to follow. A knowledge of the social, economic, cultural, religious and political background of medieval history is essential to any understanding of the period which followed it. Again one must have more than a superficial acquaintance with literature and the arts. One should be a critic both of art in its many fields, including painting, sculpture and architecture, and of literature, poetry, and learning, in general.

Such qualifications and knowledge I do not profess to have. It is, however, possible for us to appreciate, in a small manner at least, this tremendous age of revival, which is in all respects, no doubt the most outstanding period of all history.

Those of us who are attracted for the first time perhaps by the Renaissance, that brilliant age of development in art, culture, scholarship and social and political life, may imagine it to have been a spontaneous development. On the contrary, we have long since given up all belief in spontaneous generation, and to understand the true sense of the period must recognize that there was no more spontaneity in its uprising than there is in the arrival of spring. It merely waited for a favorable opportunity, remaining hidden until the season could offer the necessary environment. There was no intellectual cataclysm between the Middle Ages and the fifteenth and sixteenth centuries; yet it is perfectly clear that something on a very large scale happened, or grew in the minds of men, to distinguish the two periods.

And what was this phenomenon which produced such a striking change in the world in general, such a revival of literature and art, such a host of men whose achievements in every field of culture have surpassed every age in history before and after? It can be expressed in one phase; "the development of individualism." To be sure, the Greeks had to a great degree realized the importance of individuality, and it is to this that their surprising achievements are due. However, individuality practically sank from sight in the Middle Ages. The Church taught that it was rebellion and sin. Knowledge throughout the Middle Ages meant blind faith in dogma. In place of man's seeking to create he should endeavor merely to imitate. The period was one long winter, and if, in the seclusion of religious houses, a little scholarship and learning shone out it could not penetrate the cloistered walls. The knowledge of the

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existence of the treasures of the forgotten Civilizations, the Greek and the Roman, was held by a very few, most of whom refrained, chiefly for religious reasons from spreading it. The lost civilizations being opposed to the spirit of Christianity, as it was then, could hope to receive but little help from the Church, and during this period the Church was the only storehouse of learning and culture. Thus for centuries the secret remained hidden. Under the influence of the Church, knowledge did develop, and to no inconsiderable extent, but it was not the type that served humanity as a whole.

Individuality was not restricted merely in the field of learning, but in every other realm of life as well. It was true in the political world. When the yoke of feudalism was thrown off, it was replaced not by individual liberty, but by collective liberty. As groups and societies men were free, but as individuals they remained still in bondage. The peasantry on manorial estates were little more than serfs. In the cities, as Hulme states "the life of the craftsman was directed in all essential respects by the trade at which he worked, the corporation to which he belonged, the parish in which he worshipped, and the quarter of the city in which he dwelt. The individual was only a part of the whole." All through the Middle Ages man knew himself only as a member of a family, a race, a party, a guild, or a church. He was unconscious of himself as an individual. As Emerton states: "The typical man of the Middle Ages was he who most completely effaced his own personality that the something greater than himself—church, empire, monastic order—might be more perfectly realized."

Gradually, however, during the thirteenth and particularly during the fourteenth century man began to assert himself. And as a culmination of this assertion, we have the Renaissance. As Hulme has so aptly put it, "The deep underlying cause of the Renaissance was the revival of the individual." The reawakening of this idea of individualism in thought and action was due both to the fact that men were seriously questioning the Church's claim upon their allegiance, and to the vast movement of trade and industry. It was due as well, in no small part to the Crusades, which brought man in contact with other civilizations, aroused his curiosity about the world in general, and extended the horizon of the Middle Ages. A modern writer describes this period as that of the discovery of the world and of man.

This new individualism finds its highest expression in the movement of thought to which we give the names "Renaissance" and "Humanism." By "Renaissance" is meant the new birth of an interest in classical study. "Humanism," which developed through this study of the Classical was concerned particularly with that which we call culture. Men became tired of an ascetic ideal of life and were ready to concern themselves with things that interested them here and now. They concluded that rather than be wholly concerned with winning the hereafter, that it could scarcely be a sin for them to develop themselves, and find out all they could about the universe of which they were a part. Emerton defines "Humanism" as the

"concern of man with himself, whatever related to man, his history, his form of speech, his power to produce objects of beauty and things of use." Hulme, in one sentence, points out the true essence of the period. "The desire to study and to know the world, to put aside the fetters of arbitrary authority, and discoloring prejudice, and see things as they really are, gave birth to new thought, to literature, science, and art, and it revived the experimental method of investigation, without which it is impossible to extend the horizon of man's knowledge. It produced the Renaissance and the modern world in which we live."

The dawn of the Renaissance appeared finally with the coming of the fourteenth century Humanists, and the single individual who did most to influence the thought of his day and to bring about the new-birth was Petrarch. Hulme says of him—"Up to Petrarch the world was essentially medieval. It is with him that the modern world begins. Some of his predecessors were forerunners of the Renaissance; but he may be said to be its founder." Let us not forget, however, the tremendous influence of Dante, his predecessor and Boccaccio, his pupil. Emerton says of these three men, "In literature the three great contributors prior to the Renaissance were Dante, whose work was purely of the imagination, Petrarch, who taught men how to approach the problems of intellectual life, and Boccaccio, a purely human figure who sings of a human joy in a human fashion." Let us look for a moment into the life of the one of these three whom modern writers consider the "Father of the Renaissance."

Petrarch lived from 1304 to 1374. During those seventy years, his ambition had led him to see something of the outer world, and of the life of the courts, in the towns of Italy, as well as at Paris and Prague; but as a student of ancient classics, particularly Latin, and as such the father of the Renaissance period, his true home was in Italy. From an early age he was an ardent student of Cicero and Virgil. In his maturity he collected the manuscripts of Cicero, sometimes inscribing them himself, and sometimes employing copyists for the work. Though he could not read Greek, he advocated its study and mastery by his contemporaries, notably Boccaccio. Symonds in a discussion of his life states: "In his susceptibility to the melodies of rhetorical prose, in this special cult of Cicero, in the passion for collecting manuscripts, and in the intuition that the future of scholarship depended upon the resuscitation of Greek studies, Petrarch initiated the four most important momenta of the classical Renaissance." Petrarch was the first to realize the value of public libraries; the first to accumulate coins and inscriptions as a source of accurate historical information; the first to advocate the preservation of ancient monuments. By these means he brought to light much that added to the record of the Classical Period. He carried on an active war against tradition, pedantry, and superstition. He was openly hostile to the narrowness of scholars in theology, toward Middle Age materialists, and toward the lawyers, physicians, and astrologers in vogue, because he thought that they stood in the way of natural action of the mind. He realized that by the study of Latin, the thinkers of the modern age could arise above the scholastic

restrictions prevalent at that time and obtain spiritual freedom. And yet he was not subservient to the ancient classics, but always critical of them. He realized the tremendous advance of Christianity over Paganism and incorporated it in his creed which, as Symonds states, "compounded Roman Stoicism and Christian doctrine, adapting the precepts of the Gospels and the teaching of the Fathers, together with the ethics of Cicero and Seneca, to his own needs." In this he showed his genius and led the way for the most brilliant thinkers of the coming centuries. Hulme speaks of him as follows: "Petrarch inspired others not merely to read ancient literature, but to think as the Greeks had thought, to think as modern men think, to go to nature in the spirit of free inquiry for the data to one's premises, to attempt to appraise the things of life at their just value by means of the critical faculty which had been ignored all through the Middle Ages, to see something of the beauty and nobility of the world, to regard the present life as worthy of investigation. He was the first modern man and the founder of Humanism." Although he was one of the greatest poets of his age, it is not this faculty which brings our attention to him. He possessed the quality of arousing among men a new attitude towards life and of making it a living force. In this trait his importance to history lies.

In summing up the influence of this great pioneer of intellectual freedom let me quote the following from Symonds' book on the "Revival of Learning." "We are therefore justified in hailing Petrarch as the Columbus of a new spiritual hemisphere, the discoverer of modern culture. That he knew no Greek, that his Latin verse was lifeless and his prose style far from pure, that his contributions to history and ethics have been superseded, and that his epistles are now only read by antiquaries, cannot impair his claim to this title. From him the inspiration needed to quicken curiosity and stimulate a zeal for knowledge proceeded. But for his intervention in the fourteenth century, it is possible that the Revival of Learning, and all that it implies, might have been delayed until too late. Petrarch died in 1374. The Greek Empire was destroyed in 1453. Between those dates Italy recovered the Greek classics; but whether the Italians would have undertaken this labor if no Petrarch had preached the attractiveness of liberal studies, or if no school of disciples had been formed in Florence, remains more than doubtful."

Thus beginning with Petrarch, and following to a large extent his lead after his time, a group of thinkers arose who challenged the contempt with which the medieval theologians regarded the world and who affirmed that the earth was a good habitation and our individual existence a most precious gift. The humanists are, therefore, intellectual rebels on a social par with the great merchants and usurping princes, whom we shall see gradually attained power. They are a characteristic expression of the dominant individualism of the age.

Let us now turn our attention away from the literary background of the Renaissance, as exemplified to the highest degree by Petrarch, and attempt to attain some conception of the social, political, and economic life of the time. Let us look particularly at Italy, for it was there that the

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Renaissance first flowered. And why did the movement begin here? Italy was composed of a group of city states, warring for supremacy, each paying tribute to Rome, and each in turn subdued by the Pope whose aim was to secure supreme ecclesiastical power. She had proved herself incapable of forming a united nation, of maintaining a powerful military system, or of holding her own against the French and Spaniards. The very causes of political disunion were favorable to the intellectual growth of the Italians. Each state had formed a mixed society of nobles, merchants, and artisans. Every town was a center of activity and industry, eagerly competing with its neighbors, proud of its local characteristics, and anxious to confer distinction on citizens who attained eminence. Political struggles within the states sharpened the intellect and strengthened the personality of individuals. Exile, looming above them as a result of civil warfare made them self-reliant by throwing each man on his own resources. The despots and leaders were forced into greatest possible development of character, since their political position depended on their qualities as leaders. Birth became of less importance than natural gifts, so that any man with talent might achieve fame. The ruling class consisted of men self-made by commerce. As men proved their own ability so were they rated. Thus an aristocracy of genius grew up in Italy at a time when the remainder of Europe produced only rarely men arising above the common level.

A view into one of these cities gives us a picture difficult to imagine today. We find a wall about the city, perhaps several circles of walls, for as the city flourished and grew, the walls must be extended. Florence built its third circle in 1299. The streets were dark, crooked, unpaved passageways between houses. There were no sewers, but in their place depressions in the middle of streets received the refuse which pigs ate. Wells were located in the streets. Early each morning herdsmen drove out the cattle from the streets where they had been kept during the night.

The center of the town was given for the market place and it was here that the shops were built. Venders of food went about crying their wares. The angelus rang at the end of the working day, and curfew at the hour for the extinguishing of all fires.

Fairs were held at intervals and were times of great celebration and fun-making, as well as affording opportunities for the dissemination of knowledge and customs. These were celebrated by all of the townspeople, for all commerce ceased during these festivities. "No manner of man nor woman shall keep open shop in town at fairtime or shall show their goods in the street, but shall resort unto the fair." Such was a common edict throughout the country.

As competition between the city states developed commerce was extended. The craftsman profited by the progressive growth of commercial life. He earned a living wage. There was no unemployment. Their working days were long. Masters, journeymen, apprentices worked together, and one and all took pride in sound craftsmanship. The guild organization saved them from cut throat competition by maintaining a monopoly of the local market. The rules of the craft made it possible

for any apprentice to become a master—as often as not the artisan was an artist and never before or since were there so many masters of technique.

Socially the guilds were self centered. They cared for their sick and needy, attended funerals in a body, had yearly banquets, lived on the same street, and belonged to the same church. Religious observances of the guilds were held at funerals and also on the day of the Saint to whom their craft was dedicated—St. George for the Armourers, St. Joseph for the carpenters, St. Peter for the Fishmongers. And so we see how their religious and secular lives were united.

These guilds for years were democratic organizations, but, as the feudal pressors were gradually defeated, this democratic spirit waned. Wealth, sometimes amounting to great fortunes, was obtained by particularly capable members of the trading guilds who were quick to take advantage of their opportunities. These prosperous guildsmen were found in all instances to have engaged in business on more than a local scale, having extended their business until international trade was carried on. These large scale merchants were the men who built up the vast commerce of Venice and Genoa with the East, and made Florence the industrial center of the Mediterranean world. Thus we have the birth of capitalism. Combinations of capitalists, forming banks and stock companies, became more powerful than the guilds and often came to disregard them, with the result that the guilds lost control of the economic situation though they still exercised a great influence on Italian life. Thus we see individualism again, expressed this time by capitalism, coming to exercise a dominant force in the economic world.

With the acquisition of wealth came political power. Theoretically the chief merchant guilds controlled the political life of the city, but practically the power was wielded by the great capitalists. Their political position, however, depended on their qualities as leaders. Unless they brought the government to a higher measure of efficiency than it had been able to attain under the older democratic system, they were lost. As Schevill has stated, "they must be successful, and success demanded that they be active, inventive, and free from the bondage of tradition." This group is best exemplified by the Medici family, who actually ruled Florence, whose government, theoretically at least, was the finest example of a democracy that the world has ever seen. Through their qualities of leadership, their popularity with the people, and their great wealth, they were able to maintain an autocracy in an outwardly democratic state.

Still another group of men, which is, in the eyes of the world, the most important group of all, responded with the others to the new individualism of the Renaissance. These were the artists.

Art first came into a vigorous existence during the guild period, and following the universal trend, its practitioners formed associations for mutual protection. However, the ordinary stone cutters were not distinguished from the architects and sculptors—all being in the guild of the masons. As to the guild of painters, the early records show that they were occupied chiefly with such household matters as painting coats of arms on shields, decorating wedding chests, etc. And even when fresco painting

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became fashionable and art mounted to a somewhat higher level, the painter worked under the guidance of the Church, so that the results were productions which were saturated with medieval spirit.

Soon, however, the spirit of rebellion spread to the artists and the old customs rapidly disappeared. The religious themes were not abandoned, it is true, but the spirit of presentation changed completely. Schevill, in an article on the Society of the Italian Renaissance, states: "Theology is in retreat during Renaissance art, while humanism advances until the painters penetrate successively all the veins with which their vision had been hampered and they are enabled with liberated and amazed eyes to gaze upon the golden prospect of the earth." The painters brought to a high degree of perfection portraiture, landscape and scenes of everyday life in town and country. In short, all existence, not merely the religious part of it, became the field of the painter.

Architects and sculptors became disentangled from the guild of masons. Towns grew so rapidly that they had to be rebuilt, and new circles of walls re-erected outside of the previous ones. Public buildings were to be erected for the new government, palaces and villas for the newly rich merchants, and churches.

And so we see the several groups of individuals, humanists, merchants, princes, and artists largely liberated from the bondage of tradition and responding to the powerful and characteristic urge to achieve the fullest possible measure of self-realization and individual attainment.

Let us now turn away from these somewhat abstract observations concerning the social development of the Renaissance, and examine a family which exerted a tremendous influence in the development of this period. No story of the Renaissance is complete without reference to the Medici and their city, Florence. Young, in the Prologue to his book, "The Medici," introduces this eminent family as follows: "Then came—in the fourteenth century Dante, Giotto, and Petrarch, to arouse men again to a sense of the beautiful and cultivated; and Art and Literature begin to flow back to their long-deserted Western home. And so, out of the very grave of that old civilization of Rome, buried deep nine centuries before, comes the new inspiration, the Rebirth. But as yet there was none with power to make these efforts produce their full fruit; none with power to unearth the treasures so long buried, to spread a knowledge of them throughout the West, and to make the voices of those long dead begin again to speak.——And then, in the city which had produced three of these men, arose a family who, with the power of wealth, and with a great love for these things, lifted Learning from its grave, spread a knowledge of it through Europe, gave Art the encouragement it needed in order to advance to its highest achievements, and made that city the Athens of the West." Hulme states that "no other family has so influenced the destinies of humanity."

Let us proceed to an account of this family, who were, for over 3000 years, the most prominent citizens of Florence, the wonder city of the Renaissance. This period covers the change from Medieval to Modern history; it covers the time when the conditions changed from those

consequent to the feudal system and small, isolated states, to those brought about by regular armies and powerful nations; it covers the time when the chief political power in Europe shifted from the great independent states of Italy (Venice, Milan, Florence, and Naples) to the northern countries, France, England, and Germany; it embraces the Reformation; and it includes the extinction of the Eastern (Christian) Empire and the establishment of the (Mohammedan) Empire in its place; and it includes the discovery of America.

As regards art this period is even more important; for with the year 1400 began that wonderful 15th Century which saw the birth of the Renaissance in Art and produced a host of men in every branch of art, such as the world has never seen before and is not likely to see again.

I am spending considerable time upon this family because, by following their lives, we become acquainted not merely with them alone, but gain an insight into the development of art and learning, from the very inception of the Renaissance up through its most glowing life.

The gradual rise of the Medici from comparative obscurity, and not by military conquests, to so high an eminence is one of the most remarkable things in history. From simple bankers and merchants, they rose, in spite of tremendous opposition, until they became the most powerful family in Europe, and indeed until there was a Medici on the throne of nearly every principal country. As Young points out they are interesting from several other points of view. First of all they are interesting due to their patronage of Learning and Art. In this domain the Medici have never been approached by any among the rulers of mankind. The wealthiest family in Europe, their immense riches were lavishly expended on the revival of Learning and the encouragement of Art. In painting, Fra Angelico, Lipp, Gozzoli, Ghirlandajo, Botticelli, Lorenzo di Credi, Leonardo da Vinci, and Raphael; in sculpture Ghiberti, Donatello, Verrocchio, and Michelangelo; in architecture, Brunelleschi, Michelozzo, and Bramante; all owed much to their assistance. Particularly was this true in painting for the age of the Medici has become the classic period of this art.

They are also particularly interesting because, due to their versatility, they touched life at so many points. In statesmanship and financial capacity, in learning and artistic taste, in civil administration and sympathy with the people, in knowledge of commerce and agriculture—in all of these did their unusual ability shine out. To this was added the qualities of courtesy, agreeableness of manner, absence of arrogance, and free and generous disposition, all of which much increased their influence with the people.

Florence, in the year 1400, was the most flourishing state in Europe. Her citizens owned banks in all countries, and the golden florin had become the general European standard of value. She possessed the most republican form of government the world has ever seen. The Signoria, or ruling body, was composed of representatives from each of the 21 guilds, elected for a short period. No noble was eligible for this body. The president was the Ganfaloniere, chosen from the group to serve for a

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short period. On any large question the great bell in the tower of the Palazzo della Signoria summoned the whole male population into the square below where the question was decided by popular acclamation. Florence ruled other various subject cities, and was constantly increasing her territory by little wars with neighboring states. The chief trade was in wool and woolen cloth, both that produced by Florence and that sent there from other countries to be dyed and re-exported.

In the year 1400 Giovanni de Medici, better known as Giovanni di Bicci, was a man of 40 years, and highly respected for his character and business ability. The family were bankers and already possessed of considerable wealth. His immediate ancestors were prominent in the government of Florence, three of them having been Ganfaloniere previous to his time. Giovanni was a man distinguished for his ability as a financier and for his prudence, and had made himself highly popular with the people by the liberal way he spent his wealth for the public benefit, and by constantly being their champion in their struggle against the nobles.

In 1401, as a leading citizen and a great patron of art, he was chosen as one of the judges in the competition to determine who should make the now renowned bronze doors of the Baptistery, the oldest church in Florence. This is of interest in that the event has always been held as the "birthday" of the Renaissance in Art. It is impossible to describe the rivalry and enthusiasm called forth by this competition. Three models, those of Ghiberti, Brunelleschi, and Jacopo della Quercia, all in their early twenties, were considered superior to all others. That of Ghiberti was finally judged the best. He began work at once and was occupied by the first pair of doors for the next 22 years. The work expended on these doors, which were more perfect than anything ever seen before, and have to the present day never been surpassed, is incalculable.

In 1412 another event followed which contributed much to the outburst of Art. This was the completion, by the guild of the wool merchants, of their church of Or San Michele, and the decision to adorn the outside walls with statues of Apostles and Saints, each statue to be given by one of the guilds. Each guild desired its statue to be the finest and all the best sculptors vied with each other in the production of them. The statue by Donatello of St. George, the patron saint of the guild of the Armourers, is perhaps the most famous.

In 1419, Giovanni erected at his own cost the "Foundling Hospital of Florence," which remains to the present day. For this work he obtained the services of Brunelleschi, one of the competitors for the bronze doors. During the interval this artist had gone in disgust to Rome to learn a new art in which Ghiberti, the winner of the competition, could not be able to excel him. Now he returns to be assigned the work just mentioned. The Foundling Hospital remains notable as being the great architect's first prominent work.

In 1420 Brunelleschi was commissioned to erect the dome of the cathedral (known as the Duomo), begun 125 years before and now nearing completion. This he built without scaffolding and on a principle

derived from his study of the Pantheon in Rome. It was the first of its kind ever constructed, and was considered the wonder of the age.

In 1425 Giovanni gave a commission to Brunelleschi, which resulted in one of the chief works for which the latter obtained fame, the Church of San Lorenzo, which was falling into ruins. Giovanni now undertook to rebuild it and devoted for that purpose a large amount of his fortune. It later became the family church of the Medici, and contains the tombs of the Medici family. Symonds speaks of it as "a masterpiece of intelligent Renaissance adaptation."

In 1424, after 22 years of work Ghiberti's bronze doors were completed and were received with tremendous enthusiasm. All Florence crowded to see them and the Signoria, who only quitted the Palazzo della Signoria on great occasions, came in state to applaud his work. Ghiberti, now 45 years old, began at once on his second pair of doors, which were destined to take him still longer and to surpass even the first pair in excellence.

In 1423 painting showed the same burst of life as architecture and sculpture. In that year Masaccio, the first renowned painter, began his frescoes in the church of the Carmilities. Giovanni assisted this youthful painter, and Masaccio introduced a portrait of him in one of the frescoes. Masaccio died young, soon following this work. With him painting entered a new epoch and his frescoes were copied after by all of the great painters who followed him.

Giovanni died in 1428, leaving an immense fortune to his two sons, Cosimo and Lorenzo. As Young states: "He died deservedly esteemed by his countrymen, beloved by the humbler classes of people, who so often found in him a defender, and whose welfare he had consistently promoted, remembered with gratitude by all who, struggling to rise in some branch of Art, had never failed to receive from him a helping hand. He had assisted at the birth of the movement in which Ghiberti, Brunelleschi, Donatello, and Masaccio were the leaders; he had helped its onward course; and he died as its morning ended with the death of Masaccio and began to pass into full noon." So the chief interest connected with his life is the memorable outburst of art which took place between the years of 1400 to 1428.

Cosimo, who succeeded to his father's place in Florence had been well educated. He knew Greek, Latin, Hebrew, and Arabic, besides several modern languages, and was extremely fond of both Art and Learning. He also possessed all of the qualities which had distinguished his father. The family at this time owned banks in as many as 16 capitals of Europe. His wealth, ability, courteous demeanor, and tact all added to his popularity.

In 1430 Cosimo began the building of a new palace for the family. This palace was to be a model of architecture, and was to surpass everything of its kind. He employed an architect who was then coming into distinction, Michelozzo. He also gave various commissions to Donatello, the recognized leader in Sculpture. This included among other things the bronze statue of David, which is regarded as epoch-making in the

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history of Art. As Young states it had "a greater influence than any other statue ever erected."

In 1443 the nobili of Florence, by means of false accusations against Cosimo, succeeded in ousting him from the city. This exile, however, lasted for but one year, when Cosimo returned to obtain even greater power than before. He became the leading citizen of Florence, and maintained an autocratic, though very liberal, rule over the city. He lessened the tax burden then crushing the people, and extended commerce, thus increasing the wealth of the Florentines.

Cosimo won renown, however, in other fields than this. First of all he was a deep scholar. He maintained a staff of agents employed in searching in the East for rare and important manuscripts, which became the nucleus for the library which he founded in 1444. This was the first public library to exist in Europe, and lead the way to the establishment of others of a similar nature. This library was maintained and added to by succeeding generations of the family, and by them in 1524 the building in which it is now located was constructed, designed by Michelangelo. It contains about 10,000 manuscript books of Greek and Latin classical authors, many of them of the rarest authors, all representing a vast sum of money spent by the Medici on this splendid contribution toward the advancement of learning.

To Art he gave similar assistance, for besides being a liberal patron of the painters, sculptors, and architects, he collected objects of art of every kind and made this collection open to all artists.

To Charity he gave lavishly, giving large sums for the rebuilding of many churches and monasteries, including the Badia of Fiesole, the monastery of San Marco, and the church of San Lorenzo. He built a hospital at Jerusalem for sick and infirm pilgrims, and bore a large part of every charitable work of Florence.

In 1438 Cosimo, by his great influence, succeeded in transferring the Council between the Eastern and Western churches, which was sitting at Ferrara, to Florence. This brought not only the celebrities of the churches, but all of the most learned men of both East and West as well. He entertained all as his own guests throughout their stay in Florence.

The stimulus to the "New Learning" was inestimable. Besides bringing many eminent and learned men to Florence, some of them eventually to remain there, it brought many rare manuscripts into Cosimo's library, and above all it created personal contact and friendliness, later to have large results when Learning was driven from Constantinople by the invasion of the Turks. Young goes further than this, contributing the Reformation in a large part to this gathering.

From conversing with the Greek scholar Plethon, who was in Florence at this time, Cosimo formed the idea of the Platonic Academy which he founded. This famous academy became the seat of the highest intellectual life of the time, and its influence became later on very wide spread. Symonds says that it would be impossible to overestimate the influence upon European thought which this Plantonic Academy came to exercise about the time of the Reformation.

In 1453 Constantinople was taken by the Turks. To Florence this was a gain, for it scattered westward all the accumulation of the Ancient Learning which Constantinople had preserved. Most of this gravitated to the city where many of the leading men of the East had been entertained so hospitably 14 years before and where they knew they would find friends. This aided in no small measure in the furtherance of Learning and Art, which were Florence's greatest glories.

In the 30 years of Cosimo's rule, Art advanced to greater and greater achievements. Donatello, one of the four leaders of the Renaissance in Art, introduced as great a revelation in sculpture as Masaccio did in painting. The carving of isolated statues, which had not been attempted since the ancient period, he reintroduced. His two greatest works, are, first, his bronze statue of David, the first isolated nude statue that had been made for over 1000 years, executed for Cosimo; and the second, the celebrated statue of St. George, executed for the Armourers guild for the church of the guilds, "Or San Michele," of which I have spoken.

Ghiberti, in 1452, at last finished his second pair of bronze doors for the Baptistery. These are considered his masterpiece and were described 100 years later by Michelangelo as "fit to be the Gates of Paradise." They represent scenes from the Old Testament history. These had taken Ghiberti 28 years. He had begun his first pair of doors at the age of 23 and finished his second at 73. Alexandre Dumas said, "A whole life spent over this marvelous bronze."

We have previously spoken of Brunelleschi, and his deep influence as the leader in Renaissance Architecture.

Besides these three leaders in their various fields, there are a host of other famous artists whom we can but mention. Fra Angelico, and Lippi, outstanding in painting; Luca della Robbia, working in reliefs in marble, bronze, and glazed terracotta; Michelozzo in architecture; along with countless others. Most of these men were brought to Florence directly by Cosimo to execute various works for him. With these men as leaders, Art in every field, took tremendous strides during Cosimo's life, and his influence in making such advances possible cannot be overestimated.

Cosimo died in 1464 at the age of 75, having been the leading figure in Florence for over 30 years. At his death the Signoria conferred upon him the title of "Pater Patriae," The Father of His Country. That he deserved this title there can be no question for by his great wealth and influence in the business and political spheres, he had made Tuscany the leading country in Europe, and, by his patronage of Art and Learning, he had set her far ahead of all other cities as the leader in the cultural world.

He was succeeded by his youngest son, Piero, who is known to literature as Piero il Gottoso (the gouty one). He ruled only for five years, being practically an invalid the whole time. He was a man of fine character, a powerful scholar, and a great statesman. He was passionately fond of Art and Learning and did much to advance the work of his father. He was as eager in the collection of rare manuscripts as his father, and made many valuable additions to the Medici library. Nearly

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every work of art which remains in Florence, belonging to Piero's time was executed either for him or at his instigation.

At the death of Piero in 1469 his eldest son, Lorenzo, who was then but 20 years of age, succeeded to the rule of Florence. In him the abilities of the family reached their climax. Young says of him: "Probably no other man has ever had great talents in so many directions. In statesmanlike insight and judgment; in political wisdom and promptness of decision; in power of influencing men; in profound knowledge of the ancient classical authors; as a poet and writer who bore a principal part in the development of the Italian language; in artistic taste and critical knowledge of the various branches of Art; in knowledge of agriculture, the life and needs of the people, and country pursuits: in all these different directions was Lorenzo eminent." He has been accorded the title of Lorenzo "the Magnificent," and this name is intended to bring to our minds, not personal ostentation, but the splendor with which he invested Florence. He raised Florence to a still higher pinnacle in the political and business spheres than had his immediate ancestors. Under his rule she flourished as never before, her commerce was extended, and her wealth increased. In 1480 by diplomacy and tact he put an end to a war which the Pope, aided by the King of Naples, was waging against Florence, and had it not been for his diplomatic intervention, Florence would have been lost. As it was she retained her power as before and even extended it.

During the first nine years of Lorenzo's rule, he is especially noted for the grand festivities, tournaments, and the entertainments which he and his brother organized, at their own expense, for the popular amusement. The elaborate character of these tournaments is impossible to imagine. No expense was spared to make them the most gorgeous of spectacles. These tournaments were immortalized in both poetry and in painting. Three of Botticelli's chief pictures refer to the last tournament in 1475. These are his "Birth of Venus," his "Mars and Venus," and his "Return of Spring." All were painted for Lorenzo.

Lorenzo, however, was not always planning pageants and festivities, or engaged in State affairs. It is in the domain of Learning and Art that his chief honor lies. Following the example set by Cosimo, his grandfather, he collected manuscripts of all kinds and added greatly to the Medici, as well as other libraries. Large as had been the amounts which his father and grandfather had given to the advance of Learning, that which Lorenzo gave was still larger. For books alone he gave annually about 75,000 pounds sterling. Besides this, in order that copies of them might be multiplied, an army of copyists were maintained by him and kept constantly at work.

He founded the University of Pisa, and through his liberality to it made it one of the most celebrated universities in Europe. To the Greek academy at Florence, he gave lavishly.

But it was not through his wealth alone that he added to the Learning of the age. Lorenzo was, himself, a poet of no mean note. Young states: "Modern opinion credits him with having more of the poetic spirit

than any other man of his time, and with having been the leading poetic influence of his age." All of his literary efforts were directed toward putting an end to the depreciation of the Italian language as compared with Latin, and it is chiefly due to these efforts that his language occupies the position it does.

No picture of Lorenzo would be complete without mention of the brilliant inner circle of literary men who were his closest friends. They included Politian, considered by many as the greatest poet of his time; Marsilio Ficino, head of the Platonic Academy, and translator of Plato and many other works of the ancient writers into Latin, Luigi Pulci, another great poet; and Pico della Mirandola, whom Young calls the most distinguished literary man of the age. To these four must also be added the celebrated scholar, Cristoforo Landino; and Vespasiano da Bisticci, the great master-copyist; along with many others whom we cannot take time to enumerate. Young describes them as "a literary coterie, probably the most brilliant in intellect which has ever been gathered together at one time and place. With such men as members, the Platonic Academy attained a brilliancy which has preserved its renown ever since."

With regard to Art, Lorenzo's encouragement was equally as great. He doubled the art collections of the Medici palace; and there was scarcely a contemporary painter who did not receive assistance from him. Young states: "The leading artists of the day did most of their work for him, and nearly every work of eminence in painting or sculpture beloging to Lorenzo's time remaining in Florence, was commissioned by him." Verrocchio, the great sculptor, did almost all his work for him, including the tomb of Lorenzo's father and uncle in San Lorenzo, and his bronze statue of David. Botticelli became the Medici family painter and all of his works painted during Lorenzo's reign were painted for him. It was Lorenzo who selected and sent Leonardo da Vinci to Milan to become the great painter for the ruler of that city. There being no school for sculpture at that time, Lorenzo created one in his garden near San Marco, placed the school in charge of Donatello's pupil, Bertoldo, and invited all young sculptors to study there. It has been said that every man who studied there distinguished himself. When Michelangelo was but 15 years old Lorenzo, seeing some of his work in the garden, asked him to live in the Medici palace, where he was treated as one of the family for a period of four years. There was scarcely a contemporary painter of sculptor who was not assisted by him.

But Lorenzo was more than a patron of the artists. By his gigantic personality he inspired them. As Jerrold says, "He had the gift of imposing his personality on others; they felt with his feeling, saw with his eyes, and his influence on the art of his time is more real, though more intangible, than that of his illustrious grandfather." And so, during the rule of Lorenzo Art flourished as never before. It reached its height during these years at Florence. Its decline did not begin at once, it is true but never did it climb higher than under the patronage and inspiration of this great leader.

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With Lorenzo the Magnificent the Medici family reached the acme of their achievements. The line continued after his time, with many prominent names in history, and with great influence on the succeeding period. But we have no time, nor is it necessary to follow them further. In tracing them thus far we have achieved our purpose—that of pointing out the trend of the age—the development of the individualism which pervaded the whole atmosphere of the Renaissance and made possible the great Revival in Learning and Art.

To say that the Medici were the only patrons of Art and Learning is, of course a fallacy. That they were the leaders, however, no one can question, and in following them we have obtained a living picture of the Renaissance which would have been very difficult to secure in any other manner.

And so let us turn away from this family, Florence, and our account of the Renaissance of Art and Letters. That Art and Learning bloomed only in Florence, I do not mean to suggest. They flourished in all of Italy and to a less extent in other countries. In Rome especially, and in Venice, Milan, and other cities did they reach great heights, but Florence can be considered their foster mother, and as she was then, so today is she recognized.

That I have neglected many of the great artists of the period I am well aware. Leonardo da Vinci and Michelangelo, I have but mentioned. Raphael and others of equal renown, I have failed to touch upon. It has not been my purpose, however, to discuss any artists in detail, for this would have been from the first an impossibility. Such a discourse would have demanded a more detailed critical judgment of Art than I possess, as well as more time than the limitations of this paper permit. I have attempted merely to outline the early development of Art, and its rapid progression through the major portion of the period in which it reached its greatest heights.

In the previous discussion no mention has been made of the development of science during this period, and it is necessarily in this field, and particularly in one branch, that of Medicine, that our chief interest lies.

Did science evidence during these centuries the same development along individualistic lines as the Arts? To this question there have been considerable differences of option. Some writers have attempted to point out a regression during this interval. Sarton in an article on Science in the Renaissance states: "From the scientific point of view the Renaissance was not a Renaissance. To the historian of science it was on the whole disappointing." He believes that the Renaissance was less a genuine revival than a halfway period between two revivals. The first in the second half of the eleventh century, culminating in the thirteenth century, stimulated by the reception of the Greco-Arabic knowledge in Western Europe; and the second which witnessed the development of the experimental method, which, he states, did not begin before the seventeenth century. This leaves a period of three centuries of darkness with respect to Science, occurring exactly at the same time that the great advances in other fields of Learning and Culture were being made.

Such an option, I believe, is unjust, and is not entirely borne out by the facts. In the first place the Renaissance cannot be said to have ended before the seventeenth century. To set the date, 1600, as the end of the period is merely arbitrary. It did not die. As Sichel says: "There was no stagnation, no rotting process." Therefore, to say that the great influx of scientific data in the seventeenth century was not a part of the Renaissance is not entirely true.

That the scientific attitude lagged behind the development of culture in the form of Learning and Art, there is no question. However, the assumption that there was a stagnation of scientific thought during three centuries, that the progression of scientific knowledge suddenly stopped, and then as abruptly started up again three centuries later, picking up the threads where they were previously dropped, is not borne out by history. On the contrary there was a definite, though perhaps rather slow, advancement throughout this period. That the scientific method of thinking, that is the experimental method, did not develop until the seventeenth century certainly is untrue. Long before this, instead of depending on logic to prove their hypotheses, men were going to nature to determine whether their theories could stand the scientific test. There are many examples that we could name, but, as an outstanding one, we can look to the geographical discoveries of the age. Men realized that to determine what was beyond the horizon they must investigate in this realm, rather than merely speculate on the subject, as men before them had done. And this scientific viewpoint was carried into many fields, although it came far from being a universal trend during the early Renaissance.

During the Middle Ages Science, like Art and Learning in general, suffered much from the dictation of the Church. As Hulme states, "Medieval philosophy was no more and no less than an endeavor to give a scientific statement to medieval theology." Another obstacle to the progress of Science at this time was the slavish devotion to Aristotle that men maintained. "Logic," as Hulme states, "was the key delivered into their hands by Aristotle, and with it all the doors of knowledge should be opened. By the aid of logic alone should all truth be revealed. It is easy to see how this belief retarded scientific progress. With this magic key, what need of careful and extensive observation?" As the spread of Ancient Culture reached Italy, however, due to the menace of the Turkish invasion of Constantinople, Aristotle's works in their entirety were opened to the eyes of the scholars, and experiment replaced the logical form of reasoning. This, Hulme states, "constituted one of the most potent revivals of the Renaissance."

Among the thirteenth century forerunners of the revival of Science, two men particularly stand out. The first is Albertus Magnus, who became convinced, through studying Aristotle, that a science of nature was possible. He maintained that "the visible world was made for man's sake, in order that man might arrive at the knowledge of God through observation of it." He catalogued trees and plants, and noted the influence of physical environment upon human, animal and vegetable life.

The second intellectual pioneer was Roger Bacon, one of the greatest minds of history. He made many important discoveries, notably his work on chemicals and explosives. Besides these, by his farsighted mind, he predicted many future developments in science such as steam as a motive power, flying, etc. More important than these, however, was his employment of the scientific method. I quote from him as follows: "We must not give our adhesion to everything we hear and all we read; on the contrary, it is our duty to examine with the most careful scrutiny the opinions of our predecessors in order to add to them what is lacking in them and to correct what is false and erroneous, though with all modesty and discretion. For the truth is ever growing by God's grace. It is true that a man never reaches a perfection or an absolute certitude, but he is ever perfecting himself; that is why it is necessary not to follow the ancients blindly, for if they could come to life again they would themselves correct what they have said and would change their mind on many things. In like manner the learned men of today are ignorant of things the veriest schoolboy will know some day."

To Bacon, more than to any other man, is the world indebted for the perfection of the experimental method. But Bacon was far ahead of his time. In order that Science could advance, men had first to pick up the threads of scientific investigation left by the ancients. In medicine they went back to Hippocrates and Galen, zoology, to Aristotle, in mathematics, to Euclid, etc. This was a great forward step in itself, but likewise served as a force in the retardation of investigation, for men were prone to rest on the authority of these ancient writings, so that the many mistakes were assimilated along with the correct observations.

Nevertheless there were many advances. The work of Corpernicus in the sixteenth century in astronomy revolutionized that science. He advanced the theory, later to be proved by Galileo in the seventeenth century, that the earth turned on its own axis and together with the planets revolved around the sun.

In the field of chemistry, we have mentioned Roger Bacon. He discovered chemicals and many chemical laws. Paracelsus, coming later is another eminent man in this new field. He definitely connected chemistry with pharmacy. Alchemy finally lost its foothold and modern chemistry gradually developed.

In Anatomy, the revival was led by the penetration of the Mohammedan knowledge and skill into Western Europe through Spain, but particularly at the school of Salerno. In the medical school at Montepellier cadavers were regularly dissected. In 1308 the senate of Venice provided that each year a human body should be examined. At the Universities of Bologna and Prague a similar procedure was carried on. But nowhere was there made a careful and systematic study of the structure of the body. The greatest advances in anatomy, previous to the great work of Vesalius in 1543, with which we are all acquainted, were made, however, not at the Universities under systematized study, but by the artists of the Renaissance period. They realized that to succeed in reproducing the

wonders of the human body in sculpture and painting, it was indispensable to have some understanding of the structure of the body, or at least to know the disposition of the superficial muscles and joints. The climax of these investigations was reached by the Florentine, Leonardo da Vinci, who as Sarton states "was not only the greatest artist of his time, but may be considered also the best symbol of its scientific aspirations. No other man," he goes on to say, "ever combined the artistic and scientific ideals as intimately as did Leonardo."

With regard to Medicine, in general, definite advances were made before the seventeenth century. Before the end of the fifteenth century a considerable number of medical books had been published. With few exceptions, however, the bulk of the medical incunabula were simply reproducing ancient and medieval writings. A series of treatises dealing with a new disease, Syphilis, came nearest to our modern idea of a medical monograph. Ten of these appeared in three years and were produced by physicians of four nationalities, Germans, Italians, one Austrian, and one Spaniard.

And similarily in other fields of scientific work many advances were being made, which I will not stop here to enumerate.

That there was a universal revival of interest in science during this period, however, we cannot truthfully state. The Humanists, as a group, were prone to disregard these advances. As an example of their lack of scientific interest, we can cite the manner that they received two of the greatest events of the age, namely, the printing press and the geographical discoveries. There is no doubt that the earlier humanists, far from being pleased by the discovery of printing, were hostile to it. Vespasiano da Bisticci, one of the keenest minds of the Florentine group, remained suspicious of this new art until his death in 1498. He tells us that one of his patrons, the duke of Urbino, would have been ashamed to have possessed a single printed book. This attitude, however, soon became impossible.

Again, in their reception of the geographical discoveries, the Humanists showed their lack of interest in Science. This is illustrated by the fact that the literature, during the fifteenth and first half of the sixteenth century, devoted to these exploits is utterly insignificant.

It is also a notable fact that the main contributions to scientific advancement, in practically every field, were not made by this group, but by the more humble craftsmen, who were bent on solving the simple problems of their craft, and found the means for their solution.

With these facts before us we cannot say that Science underwent an actual revival in any way comparable to the Revival of Learning and Art. Neither can it be said that there was a period of darkness between the thirteenth and the seventeenth centuries. That there was a definite advancement cannot be doubted. The progression of scientific knowledge, although perhaps a slow and tedious one, did occur and was a potent factor in making possible the more startling advances of the seventeenth century.

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In conclusion, I wish to emphasize again that, from the start, I had no hope of treating this glowing age in a comprehensive manner. I have primarily followed the lead of my own interest in the period, and this perhaps in too much detail, to the exclusion of a great deal which might have been recounted to greater advantage. However, if I have succeeded in illustrating and emphasizing the one characteristic, that of the revival of the individual, to which a great part, if not all, of the advancement and revival in every field was due, I feel that I have achieved my purpose.

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ABBREVIATION. MORE OR LESS.

By FRANK PLACE, *Reference Librarian, N. Y. Academy of Medicine.*

Abbreviation is vexation,
Transcription is as bad;
The Rule of Three doth bother me,
Verification drives me mad.

"Apt Abbreviation's Artful Aid" is nowhere more imperative than in the field of medical bibliography. This field is reverting to forest, with much dead wood, forest still penetrable indeed, but whose extent is increasing yearly, monthly, weekly. Each specialty cultivates its corner; beyond, all is pulp-wood. The bibliographer who gleans this field has to keep his wits about him lest he be buried under the rain of leaves from this forest, leaves that are very dry and increasingly fragile with time. The fourfold "A" quoted above enables him to bale up his crop in manageable form. This Artful Aid has its drawbacks, and it is the purpose of this note to show some of brevity's dangers and how we need less,—or is it more?—abbreviation. That is we must guard against reducing words to a meaningless jumble of letters.

In the compilation of a list of journal articles shortness of entry is required by all the parties to the transaction; by the writer that he may get on with his work; by the editor that he may get the material into practical compass; and by the publisher that his funds and his space may not untimely perish. The reader and bibliographer have much the same reasons. This cry for compactness has for long enabled us to express numbers in a convenient shorthand, though we use Arabic signs to do it. Each nation translates figures into its own language without hesitation and with unanimity. In the reduction of words to letters we are not so fortunate. Whereas a numeral stands for a definite number, a letter may stand for any of a number of different words, one guess being as good as another perhaps. The combination of 4 and 5 as 45, is read forty-five; but A as an abbreviation in a journal title may represent American, Annales, Annali, Annalen, Annals, Arbeiten, Arbeten, Archives, and others, including "A series," and Abteilung. Abbreviations should represent words even to the average reader of periodicals. A.f.O. is hardly enough. Arch. f. Ophth. narrows the field to the title intended.

Sufficient context in the abbreviations themselves to preserve the language of the title should be maintained. Thus Arch. Oph. may be one of several titles in as many languages. Arch. d'Ophtal., Arch. f. Ophthal. would seem the shortest forms to use. The placing of the prepositions and conjunctions helps in many such cases: as Arch. Path. Anat. might even represent Archiv für Path. und Anat., Archives de Pathologie et Anatomie or Archiv für Pathologische Anatomie. Duplications of titles of journals have taken place and will take place more and more as time

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passes, either in actual words or in order and importance of words. Arch. Derm. & Syph. already refers to more than one journal.

A critical situation occurs at the time of transcription of the list of references, from manuscript to type, type to manuscript. Copying a list of references, or jotting down the single item is the portal of infection of many a germ of mischief. It begins with the author who, in reading, makes note of the article quoted in the text. His note of "Arch. XXX, 347" he later writes in as Arch. Oph. XXV, 347 1920. His typist in rounding up the lot makes a neat copy containing the item "Archives of Ophthalmol. 1930, 25:347. On emerging from the compositor the line reads Archiv. Ophthal. 1930, 52:347, which escapes the eagle eye of the author and looks all right to everybody else. Now the reader tries to find the article: you know what happens. He turns to the librarian who knows less about the situation than the reader, but who possibly realizes what has happened and begins ringing the changes first through the possible titles, then through the figures. This "quotation" may be exaggerated, but similar cases occur to you all.

The third part of my text, the Rule of Three, is concerned with the three C's: Conciseness, Completeness, Correctness. The conciseness speaks for itself: for it the abbreviations were invented. But the ideal situation of every reference: Author, with initials; title of paper; name of journal in which found; years; volume; page; may though concise still be incomplete. The year may be only that of the title-page, not that of publication of part concerned. The volume may have a supplement, or be in two parts; or may be in second series rather than the first. Even the page may refer to a monthly number in which the page numbers repeat that of every other month, or it may be among the advertising or supplementary pages as in the Presse Médicale. Thus any or all of the items of a reference may have to be qualified.

The third C merges into the last line of the verse: Verification. Correctness in the citation is what the bibliographer wants but to which the author so often pays little or no attention. "Nobody will ever look at these references" is almost a stock phrase among the writers of medical papers, in spite of the many experiences each one has with wrong references. How to insure correctness is the question. It is a well-known fact that one who works over a mass of material acquires a psychological blindness to it all. It is true of bibliographic material at least. There is a certain let-down in the writer's alertness that lets in a host of variables. To insure a reasonably accurate list of references it is well to turn it all over to one who has not handled the list that he may compare it with the journals themselves. The turning up of the page in the volume is a revealer of many errors. His approach is that of every reader in all places. He should go over the whole bibliography, item by item, go to each volume and compare author, paper's title, even to spelling, title of journal, the volume number, the date of the issue, and the page number, noting corrections on the MS.

Author and secretary will be mortified and even incredulous at the number of items corrected or not found. It is indeed a rare manuscript that comes back without correction, so rare that a few bets will add to the income of the verifier. In my own experience I can think of but one that went back to the author as clean as when typed.

SUMMARY

Abbreviations are necessary in publication of bibliographic references. They should be concise, complete and correct. Abbreviation should not reduce titles to unintelligibility or to confusion, but as far as possible should contain the elements of their own identity. In all bibliographies verification is a necessary final service. Frank Place.

NOTES FOR THE ATTENTION OF MEMBERS

Mr. James F. Ballard's Service at the Boston Medical Library

On October 24, 1932, Mr. James F. Ballard, the Director of the Boston Medical Library, completed forty years of service in that institution. Mr. Ballard entered upon his life-work as a boy of fourteen in 1892 when the Library occupied a small building in Boylston Place. In 1900 a large new building was erected at 8 The Fenway where the Library now makes its home. Mr. Ballard held the title of Assistant Librarian for many years, receiving his title of Director in 1930.

Upon the occasion of his anniversary Mr. Ballard was informally remembered by his office workers and friends.

From: New England Journal of Medicine, 1932, vol. 207, p. 806.

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Appreciation of the Exchange from the San Diego Medical Library. "Bulletin of the San Diego County Medical Society," November 18, 1932.

Once more we wish to remind you of the value of the Medical Library Association to the Medical Library. The work of the Exchange is tremendous, and Miss Ella B. Lawrence, the Manager of the Exchange deserves all the credit due her. Again we wish to remind our members that duplicate journals are used in this work, and many books that might otherwise be thrown away. This work is largely unknown except to those directly interested in the library, however, as no one knows about its extent and value except the Library Committees and those working with and interested in their special library. It is work that is literally done "behind the scenes" as is the indexing, cataloging, etc., about which no one knows except the librarian. However, there is much satisfaction in this work—the real joy of being of use to other libraries and the saving of valuable material, to say nothing of the sets completed in our own library and volumes added thereto.

The Librarian.

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The date of the next annual meeting of the Medical Library Association has been definitely set for June 19-21, 1933. All the meetings, with the exception of one short session, will be held at Northwestern Medical College.

See announcement by Judith Wallen Hunt, Program and Entertainment Committee in this number.

Program will be published in the next number of the Bulletin.

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A SELECTED LIST OF NEW PERIODICALS ADDED IN 1932

(July to December)*

Abhandlungen der Medizinischen Fakutlaet der Sun Yatsen-Universität. Canton, China, vol. 1, 1929.

Anales de medicina interna. Madrid, vol. 1, 1932.

Annual review of biochemistry. Stanford University, Cal., vol. 1, 1932.

Archivio italiano delle malattie dell'apparato digerente. Bologna, vol. 1, 1931.

Art et médecine. Paris. Paris, vol. 1, 1930/31.

Bulletin of the Geo. F. Geisinger Memorial Hospital, Danville, Pa., vol. 1, 1932.

Bulletin of the Southern Pacific General Hospital., San Francisco, vol. 1, 1932.

Character and personality, Durham, N. C., vol. 1, 1932.

Diabetes, N. Y., vol. 1, 1932.

Hospital forum. (Hospital Association of New York State), N. Y., vol. 1, 1931.

Industrial medicine, Chicago, vol. 1, 1932.

Jahrbuch für das gesamte Krankenhauswesen, Berlin, vol. 1, 1932.

Journal of the Biological Photographic Association, Menasha, Wis., vol. 1, 1932.

Journal of pediatrics. (American Academy of Pediatrics), St. Louis, vol. 1, 1932.

Proceedings of the California Academy of Medicine, Stanford University, Cal., vol. 1, 1930.

Quarterly bulletin of the Health Organization, (League of Nations), Geneva, vol. 1, 1932.

Radiologische rundschau, Berlin, vol. 1, 1932.

Southern surgeon, Atlanta, vol. 1, 1932.

University of Washington publications in biology, Seattle, vol. 1, 1932.

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* For the January to June list see: *Bulletin of the New York Academy of Medicine*, Ser. 2, v. 8, p. 477, 1932.